A. The recited "and the like" was deemed indefinite. This phrase has been eliminated.

B. Claims 2-7 were rejected per the phrase "vinyl acetate polymer based emulsion" being inconsistent with the antecedent "vinyl acetate based polymer" in Claim 1. This has been corrected so that the phrase is now --vinyl acetate based polymer--.

C. Claim 5 was deemed indefinite per the non-antecedent basis for "catalytic". An amendment has been made to change "catalytic" to --catalyst--.

D. The recited "2-hydroxy-2-sulfinato propionatic acid-disodium salt" in Claim 4, was deemed to engender non-art recognized terminology. Applicants' attorney checked with one of the inventors and the inventor believes that it is proper nomenclature. If Examiner has another version, please advise.

35 U.S.C. §103(a)

In paragraphs 3 and 4 the legal requirements were provided for the rejection of all claims under 35 U.S.C. §103(a) for reasons of obviousness. Paragraph 5 sets forth the reason for the rejection of Claims1-7 under 35 U.S.C. §103(a) over Pinschmidt, Jr. et al (US 4,360,632) and Wiest et al (US 4,044,197.)

Pinschmidt, Jr. was relevant to the claimed process on the basis that nonwoven adhesive products based upon vinyl acetate/ethylene/N-methylolacrylamide polymerized in the presence of a formaldehyde free reducing agent, i.e., a ketone bisulfite, were disclosed.

Wiest et al was deemed relevant as disclosing self cross-linkable adhesives based upon vinyl acetate-ethylene and N-methylolacrylamide polymerized in the presence of hydrogen peroxide, t-butyl hydroperoxide and a reducing agent such as sodium dithionite. At col. 5, lines 12-18, several sulfite reducing agents are listed including sodium formaldesulfoxylate. The Examiner maintained the rejection on the basis that the selection of the reducing agent was a matter of choice. Absent evidence of unexpected results the claims stand rejected.

Argument

Applicants found that a special class of reducing agents when used in the production of vinyl acetate based polymers containing N-methylolacrylamide, and optionally other monomers, result in reduced levels of formaldehyde than do other non formaldehyde emitting reducing agents, e.g., ascorbic acid or sodium bisulfite and the like. This feature was

emphasized in the Summary at page 3, lines 18-20, and Examples 1 and 2, pages 7 and 8, of the specification.

It is agreed that Pinschmidt, Jr. et al discloses the use of ketone bisulfites. A significant difference between Applicants' claims and Pinschmidt, Jr. et al, however is the fact that a ketone bisulfite is not *prima facie* suggestive of the sulfinic acid derivatives having CO_2M functionality as required by the claims. It is respectfully submitted that the ketone (C=O) is not equivalent nor suggestive of the CO_2M functionality, not to mention other compositional differences between the two classes of reducing agents. Although Pinschmidt Jr. et al discloses the production of formaldehyde free emulsions, there is no suggestion that the ketone bisulfite is more effective than other non formaldehyde reducing agents when emulsion polymerized in the presence of N-methylolacrylamide. Even if it were, it is respectfully submitted that it would have no bearing on the resolution under 35 U.S.C. §103(a), since there needs to be more of teaching of a chemical equivalence here to establish a *prima facie* case.

Wiest et al discloses vinyl acetate based polymers containing N-methylolacrylamide as the Examiner suggests. However, the reference discloses sodium dithionite as the reducing agent. Per a chemical dictionary sodium dithionate has the formula $Na_2S_2O_4.2H_2O$. Applicants claim a reducing agent having an entirely different formula in Claim 1 for the application. Applicants do not understand the basis for concluding this teaching is sufficient to establish a *prima facie* case of obviousness.

Even assuming a *prima facie* case of obviousness was made by the references cited by the Examiner, that prima facie has been adequately rebutted. The prior art as represented by Mudge et al (US 5,540,987) and referenced at page 2, lines 8-15, of the specification, discloses a number of formaldehyde free reducing agents to reduce free formaldehyde content in nonwovens, and it was found ascorbic acid was more effective than other reducing agents including sodium bisulfite. Applicants have shown the glycolic acid adduct of sodium sulfite sold under the trademark Bruggolite FF6 was even more effective than ascorbic acid. There is no teaching that would suggest such an unexpected and superior result. The other sulfites of the formula in Claim 1 are homologues or related structurally to the Bruggolite FF-6 reducing agent. Absent a reference illustrating that these would not offer similar results to the reducing agent shown, Applicants are entitled to the reasonable coverage afforded by the compositional structure in Claim 1.

In view of the foregoing it is requested the application be reconsidered and after reconsideration the rejections withdrawn.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attachment is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

Respectfully submitted,

Mary E Bongiorno

Mary E. Bongiorno
Agent for Applicants
Registration No. 36,091

7201 Hamilton Boulevard
Allentown, PA 18195-1501
(610) 481-8820

VERSION WITH MARKINGS TO SHOW CHANGES MADE

The specification has been amended as follows:

The title to Example 1 at page 7, lines 22-23, of the specification, as been amended as follows:

Polymerization of Vinyl acetate/Ethylene/N-methylolacrylamide Binder Using Glycolic Acid Adduct of Sodium Sulfiate Reducing Agent

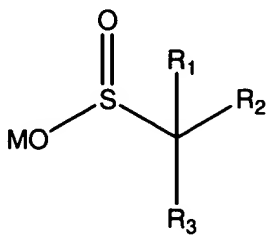
The title to Example 2 at page 8, lines 20-21, of the specification, has been amended as follows:

Comparison of Vinyl Acetate/Ethylene/N-methylolacrylamide Binders Using Glycolic Acid Adduct of Sodium Sulfiate Reducing Agent and Ascorbic Acid

The claims have been amended as follows:

1. (Amended) In a vinyl acetate based polymer ~~based emulsion~~ formed by the emulsion polymerization of vinyl acetate and N-methylolacrylamide, optionally other monomers, in the presence of a stabilizing system and a redox catalyst system comprised of an oxidizing agent and a reducing agent, the improvement for reducing formaldehyde emissions in the resulting emulsion, which comprises:

forming said vinyl acetate based polymer ~~emulsion~~ utilizing as the reducing component of the redox catalyst system a reducing agent of the formula:



where M is a hydrogen atom, an ammonium atom or a monovalent metal ion, R_1 is OH or NR_4R_5 wherein R_4 and R_5 each are H or C_1-C_6 alkyl; R_2 is H or an alkyl, alkenyl, cycloalkyl or aryl ~~and the like,~~ and R_3 is CO_2M.

2. (Amended) The vinyl acetate based polymer ~~based emulsion~~ of Claim 1 in which the vinyl ~~acetate~~ acetate based polymer ~~based emulsion~~ comprises ethylene in an amount of from about 10 to 40% by weight of the polymer.

3. (Amended) The vinyl acetate based polymer ~~based emulsion~~ of Claim 2 wherein the N-methylolacrylamide is present in an amount of from about 0.5 to 10% by weight of the polymer.

4. (Amended) The vinyl acetate based polymer ~~based emulsion~~ of Claim 3 wherein the reducing agent represented by the formula is selected from the group consisting of: 2-hydroxyphenyl hydroxymethyl sulfinic acid-sodium salt; 4-methoxyphenyl hydroxymethyl sulfinic acid-sodium salt; 2-hydroxy-2-sulfinato acetic acid-disodium salt; 2-hydroxy-2-sulfinato acetic acid-zinc salt; 2-hydroxy-2-sulfinato propionatic acid-disodium salt; and ethyl 2-hydroxy-2-sulfinato propionate-sodium salt.

5. (Amended) The vinyl acetate based polymer ~~based emulsion~~ of Claim 4 wherein the vinyl acetate based ~~emulsion~~ polymer is formed using a redox catalyst~~ic~~ system of hydrophobic hydroperoxide and the glycolic acid adduct of sodium sulfite~~onate~~.

6. (Amended) The vinyl acetate based polymer ~~based emulsion~~ of Claim 3 wherein M is sodium or zinc.

7. (Amended) The vinyl acetate based polymer ~~based emulsion~~ of Claim 3 wherein R_1 is OH.